Predicting Harmful Algal Blooms (HABs) in Lake Erie: HAB Tracker

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Before attending this meeting, had you heard of the HAB Tracker tool?

A. Yes

B. No

C. Sounds familiar/ Maybe

Have you used HAB Tracker before?

A. Yes

B. No

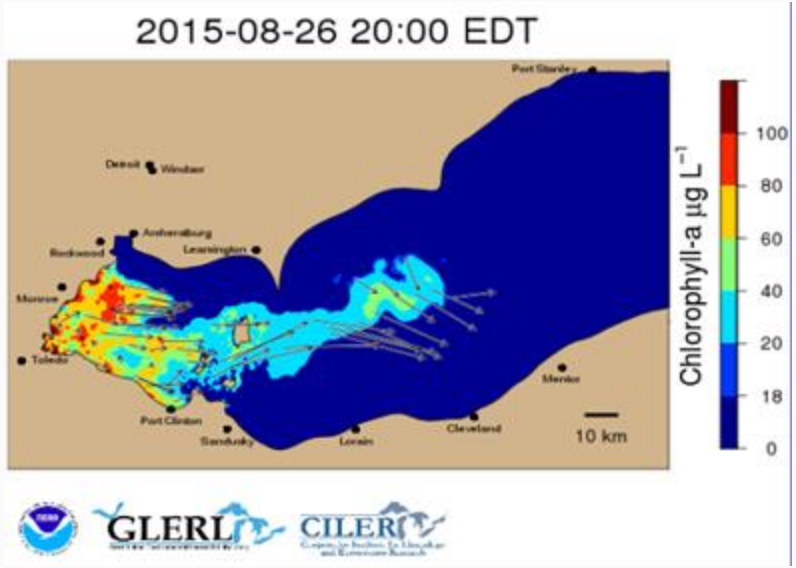
C. Not sure

NOAA's HAB Tracker

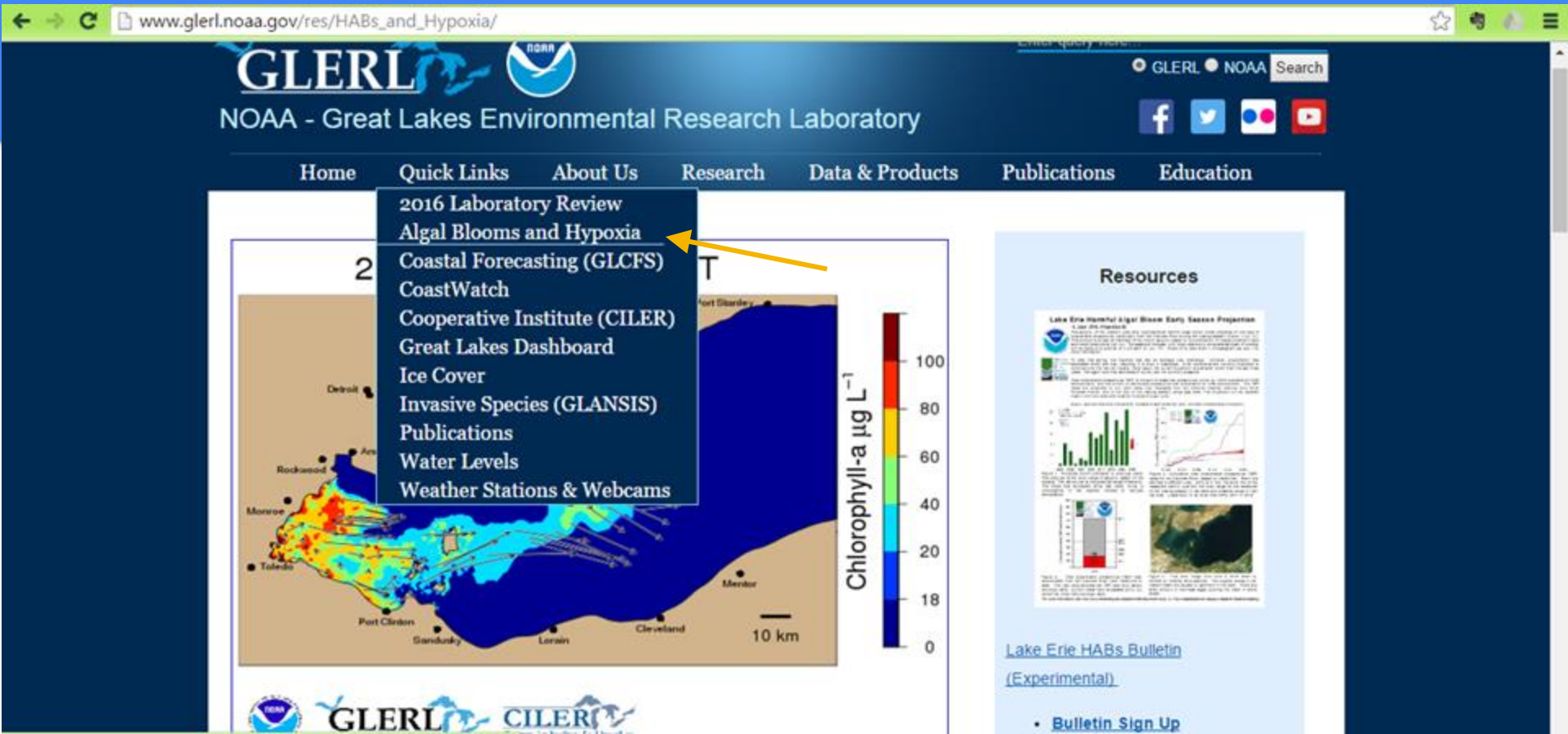
- Experimental, short-term forecast model
- Daily updates & 5 day predictions

Purpose:

- Where are blooms?
- How big are they?
- Where are they likely headed?



HAB Tracker: www.glerl.noaa.gov



HAB Tracker: www.glerl.noaa.gov

HAB Tracker: Animated Forecasts

www.glerl.noaa.gov/res/HABs_and_Hypoxia/habsTracker.html

GLERL CILER Great Lakes RESTORATION

Lake Erie HAB Tracker - * *EXPERIMENTAL* *****

Back to the GLERL HABs and Hypoxia Page

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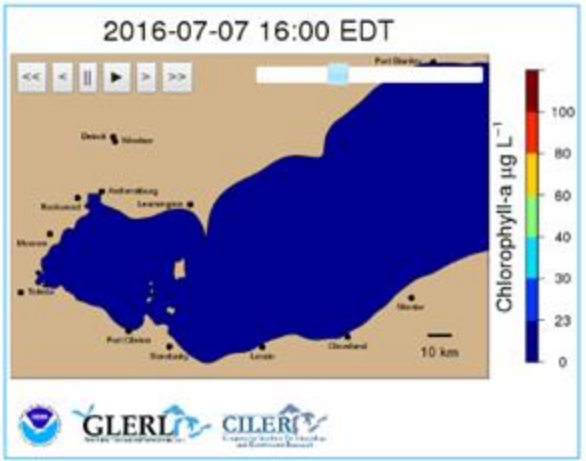
Tracking potential Harmful Algal Blooms

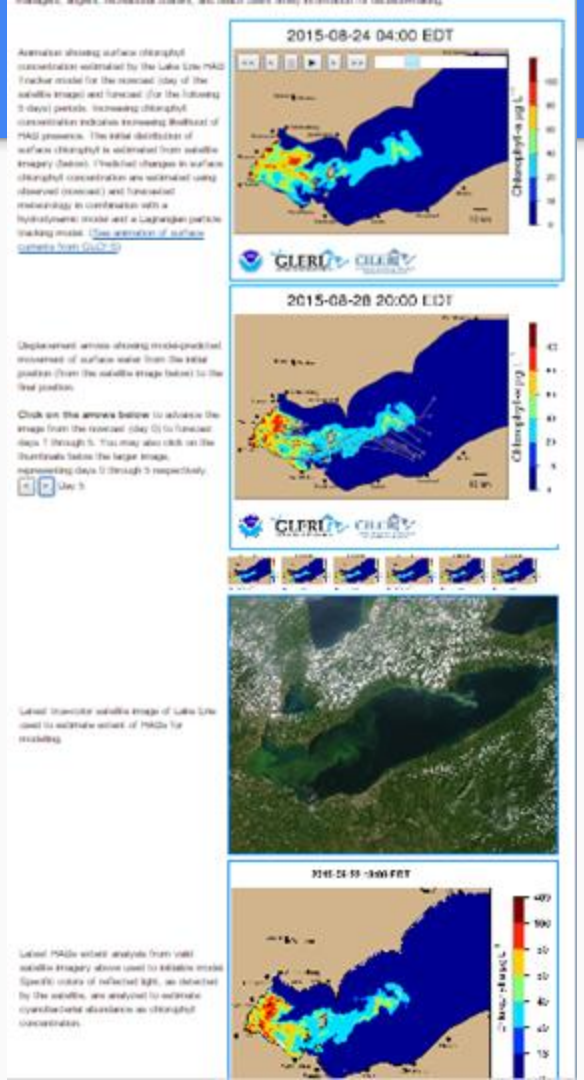
The HAB Tracker is a tool that combines remote sensing, monitoring, and modeling to produce daily 5-day forecasts of bloom transport and concentration. This product takes daily satellite imagery and real-time monitoring to estimate the current expanse and intensity of the bloom, where we can use forecasted meteorology and hydrodynamic modeling to predict where the bloom will travel and what concentrations are likely to seen on a 3-dimensional scale. These predictions can provide water intake managers timely information for public health decision-making.

Animation showing surface chlorophyll concentration estimated by the Lake Erie HAB Tracker model for the nowcast (day of the satellite image) and forecast (for the following 5 days) periods. Increasing chlorophyll concentration indicates increasing likelihood of HAB presence. The initial distribution of surface chlorophyll is estimated from satellite imagery (below). Predicted changes in surface chlorophyll concentration are estimated using observed (nowcast) and forecasted meteorology in combination with a hydrodynamic model and a Lagrangian particle tracking model. (See animation of surface currents from GLCFS)



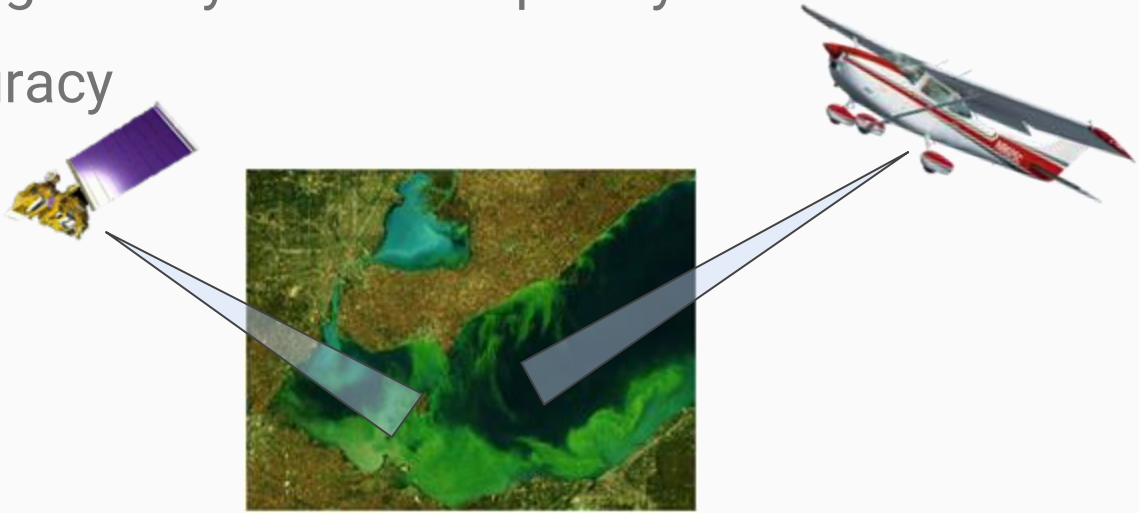
HAB Tracker: Interpretation?

- Animated 5 day forecast of surface concentrations
- 5 day forecast images with displacement arrows
- Latest satellite true-color image of HAB extent
- Satellite image in HAB Tracker format



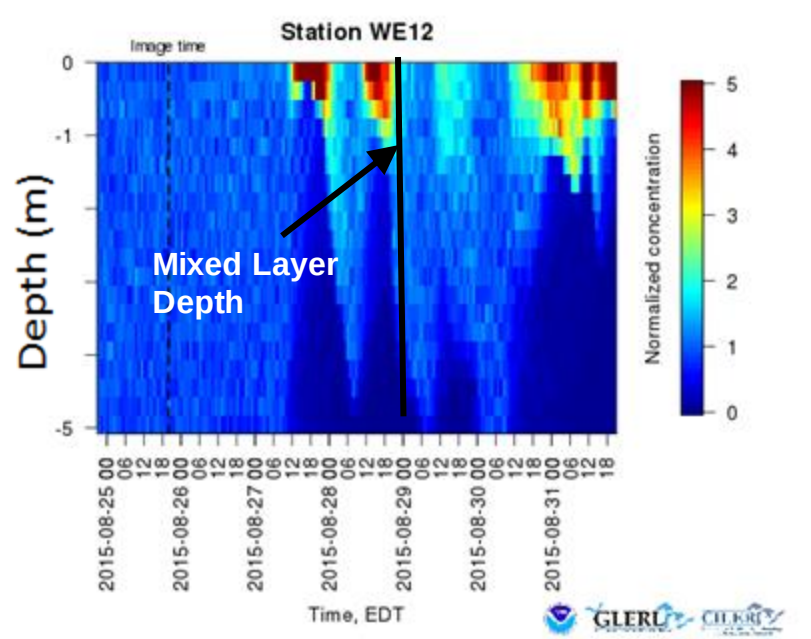
HAB Tracker: Hindcasts

- Looking at monitoring & buoy data from prior years to evaluate model accuracy



HAB Tracker: Improving Forecasts

Vertical Distribution

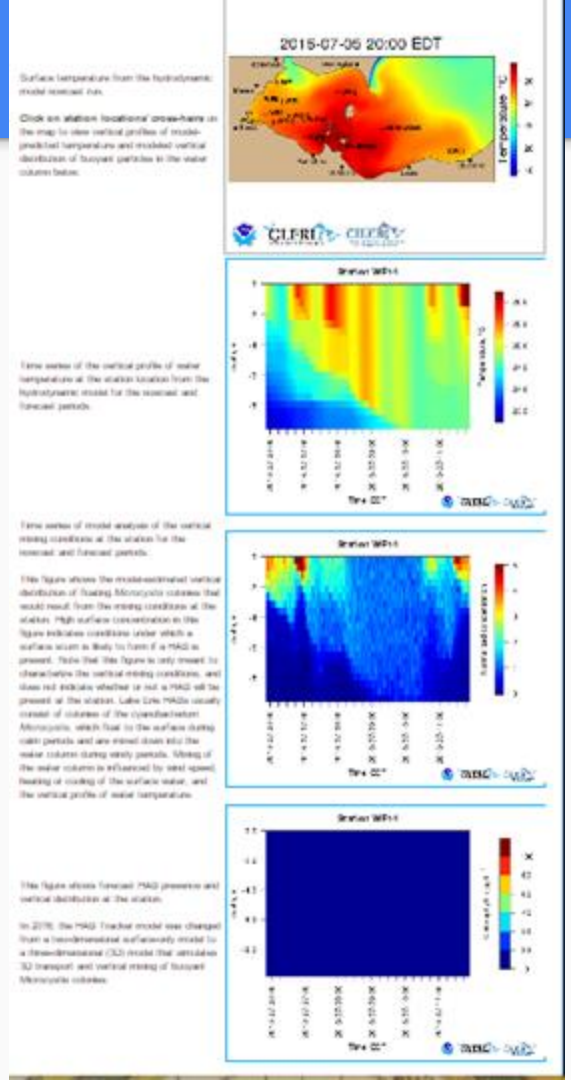


Vertical Mixing

- What's happening below the surface?
- Will it mix to the bottom?

HAB Tracker: Vertical Mixing

- Current surface temperatures
- Predicted vertical profile of water temp at station over time
- Predicted potential for vertical mixing of bloom at station
- HAB Tracker prediction for vertical mixing of bloom at station



Thank You! Questions?

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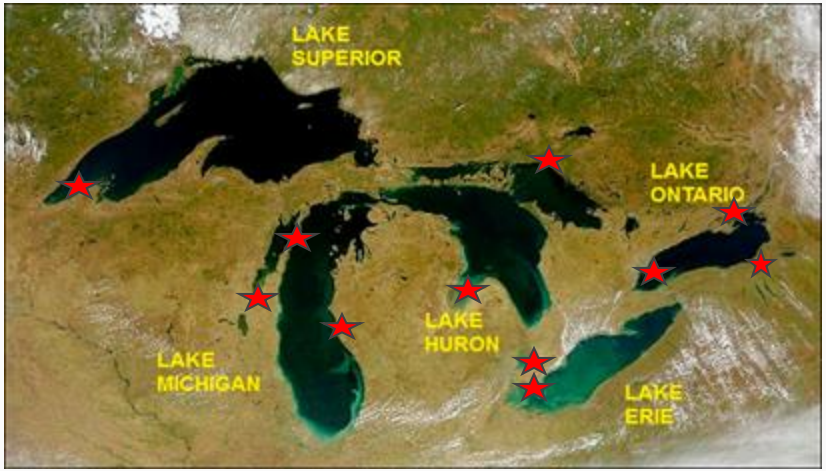
Citations

Michalak, A. et al. (2013) “Record-setting algal bloom in Lake Erie caused by agricultural and meteorological trends consistent with expected future conditions.” PNAS 110(16): 6448-6452.

What contributes to HAB growth in Western Lake Erie?

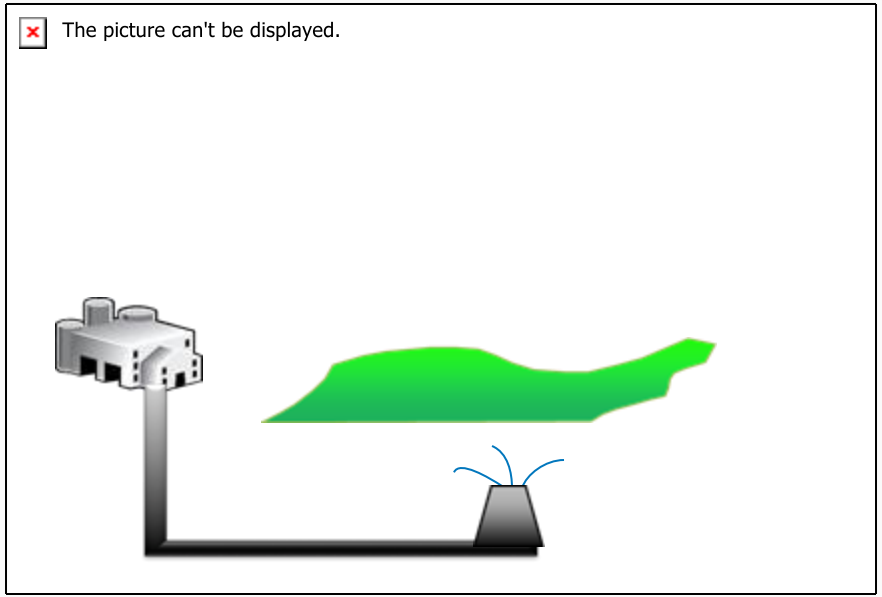
- Lots of Nutrients (Primarily Maumee River)
- Shallow (warm)
- Weak water circulation



Impacts of HABs in Lake Erie

Harm to People

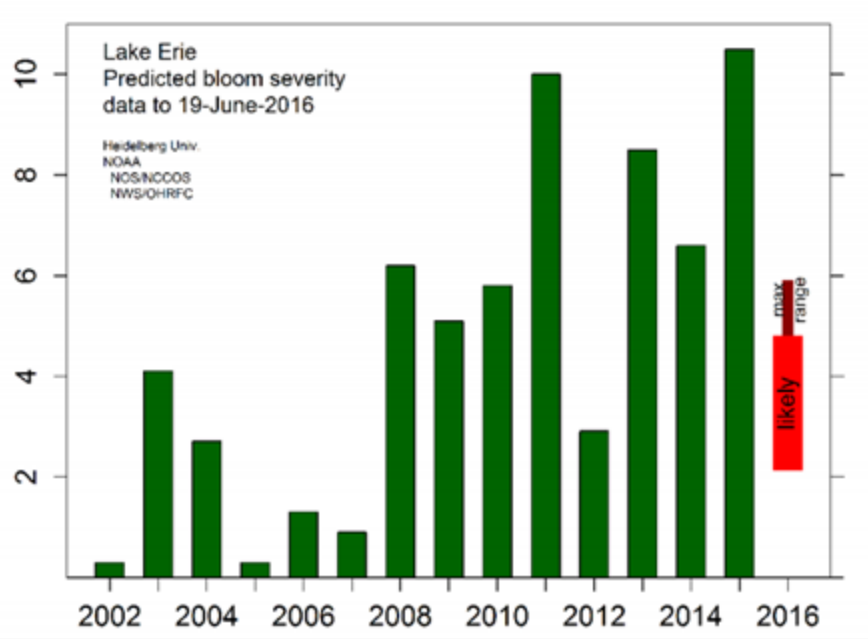
- Polluted Drinking Water
- Peaks during tourism, fishing, recreation months



Harm to Pets & Wildlife

- Can poison pets
- Decreased light harms aquatic plants

Trends in HAB Growth



- HABs reemerged in early 2000s
- Problem will likely continue, but agencies working to address problem (Michalak, 2013)